

## **Transportation Workshop: Bus Rapid Transit in the Milwaukee Region**

Urban Planning 692/Architecture 790—3 Credits—Fall 2015 (Graduate Level)

Mondays from 5:30 to 8:10 p.m., AUP Room 194

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Office Hours: Tu: 10-noon, W: 1-3 pm (AUP 334)

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### **Course Description**

Bus Rapid Transit (BRT) systems have become a new transit phenomenon in the United States and abroad. They differ from traditional bus service because they are on dedicated rights-of-way (bus-only lanes, tunnels, or elevated lanes), consolidate passenger access at stations every one-half to one mile, allow at-level boarding at multiple doors, and provide much faster service than local buses. These systems also differ from light-rail transit because they do not have rails, are less expensive, and have greater route flexibility. BRT systems provide high-speed service in areas with the highest transit demand.

In contrast to standard bus stops, BRT stations may have the potential to attract transit-oriented development. If BRT can attract denser housing and employment near stations in Milwaukee, it will increase the potential number of people who can use the system to meet their daily needs. This could ultimately reduce automobile travel roadways and reduce the space needed for parking lots in areas of the region served by the transit system.

Recently, several transportation agencies and organizations have proposed BRT as an option to create well-connected, high-speed public transit in the Milwaukee metropolitan region. If this system were to be developed, what would it look like? What would the stations look like? Where would the routes go? How would the bus lanes be designed? This course will propose answers to these questions. It will be a hands-on workshop that will produce professional products useful to government agencies and the general public. Final products will include a professional report, presentation slides, and visual displays (e.g., system maps, corridor cross-sections, and station designs) that will communicate a clear concept of what bus rapid transit could look like in the Milwaukee region. These final products will draw upon input from a meeting with practitioners and be presented at a public meeting.

We are looking forward to a great term with all of you!

Bob & Ivy

## Course Objectives

By completing this course, students should be able to:

- Describe elements of a BRT system.
- Review previous plans in the Milwaukee region that have recommended BRT.
- Assess benefits of BRT systems and identify obstacles to developing BRT in Milwaukee.
- Explain the decision-making process that individual travelers use to choose a specific mode (e.g., transit, automobile, or bicycling) for routine travel.
- Understand different metrics that can be used to evaluate transit system performance.
- Work effectively with group members to analyze and illustrate the concept of BRT.
- Communicate a vision for a potential BRT system in Milwaukee to agency staff, elected officials, and the general public.

## Readings and Class Participation

Readings will be available under “Content” on the class D2L website (<http://d2l.uwm.edu/>). All students are expected to read all the assigned readings BEFORE class and to actively participate in the discussion of readings.

Active participation in class is an important component of this course. Classes will involve course instructor presentations, professional guest lectures, and group work sessions. It will be important for all students to:

- Arrive on time and stay for the duration of class.
- Turn off phones and other mobile devices for the duration of class.
- Turn off laptops unless instructed otherwise and refrain from accessing the internet on any other device during class.

Behaviors that detract from class learning will be penalized in the class participation grade.

## Format

The class is organized as a workshop. In most classes, we will discuss with all groups and review the team work. Additionally, we include lectures in the first half of the semester to introduce the basic concepts and tools associated with BRT.

## Team Tasks

The tasks below will be performed in groups. Approximately five students will be in each group. Leadership will emerge within each group, but all group members must participate. Students will have an opportunity to list their team preferences during the Week 1 class and will be assigned to a team before the Week 2 class.

Operating like a professional planning, engineering, or design firm, most course work will be done in teams. Each team needs to be aware of the overarching vision for the BRT project, and each individual needs to understand the specific task that needs to be performed by her or his team. In other words, communicate regularly. Use other weekly meetings to focus on your team’s specific task and class time to make sure that your team’s work is consistent with other teams’ visions. The themes and specific topics for each team to address are listed below. Note that some of these topics will be explored in more depth than others and that there may be additional, unlisted topics identified during the semester that each team should also address. The scope of work for each group will be developed during discussions between team members and discussions with course instructors throughout the semester.

- *Management and Economic Team* (Management: Understand all aspects of the BRT proposals being considered, and communicate with all teams to ensure that a cohesive product is being developed. Bring together work from all teams into a cohesive product at the end of each Task. Economic: Quantify costs of BRT and identify potential funding sources. Potential benefits of BRT: These benefits may include increased job access, increased real estate development, increased land values, better public health, decreased pollution, and efficient use of space. Summarize benefits from other regions—including local business/economic development; quantify potential benefits of proposed system in Milwaukee.)
- *Planning and Equity Team* (Planning: Station area density requirements. Station area zoning requirements. Existing zoning and future land use plans. Opportunities for Transit-Oriented Development. System map with potential routes and station locations (technical map in GIS and conceptual map for the public). Equity: Accessibility of low-income and minority populations. Environmental impacts. Health impacts. Citizen input and preferences for high-speed transit system development, potentially through online or in-person surveys.)
- *Engineering Team* (Engineering: Compile existing ridership numbers by route and by stop. Identify operational characteristics, including travel speed and headways on different potential routes. Conduct comparisons of transit and automobile travel times. Develop demand forecasts for different potential routes. Propose traffic signal timing for example corridor.)
- *Corridor and Station Design Team* (Corridor Design: Typical roadway cross-sections. On-street parking restrictions. Intersection signalization. Integration with other modes, including pedestrians and bicyclists. Station Design: Example station designs, including high, medium, and low cost. Station designs include platforms, shelters, waiting areas, and payment kiosks. Station designs should also bus access from the platform and platform access from surrounding sidewalks and properties.)

**Task 1: Complete BRT Background Report (Due Week 6)**

The background report will include a summary of other existing and planned US and international BRT systems and provide an overview of current transit systems in the Milwaukee metropolitan area. It will answer foundational questions, such as: What are the elements of BRT? What are the benefits of BRT? What are the challenges of BRT? What BRT ideas have already been proposed in the Milwaukee region? Each team should summarize references related to their specific task area.

Qualities of a good report:

- Well-written text that answers the questions above.
- Good organization, including a table of contents and section headings.
- A clear statement of the purpose of the report and the intended audience (the intended audience is local urban planning professionals (planners, engineers, designers, advocates).
- Graphics, including pictures, figures, and/or tables to illustrate key points.
- Supporting appendices, if applicable, to provide background information that is too detailed for the text.
- Correct reference of the sources that you used in the report.
- A discussion section describing lessons that Milwaukee can learn from the previous studies.
- A conclusion that includes next steps for Milwaukee and ideas for Task 2 (below).

**Task 2: Prepare several scenarios for BRT in the Milwaukee Region to present at Practitioner Workshop (Due Week 11; Practitioner Workshop to be held during Week 11).** We will present several alternatives for the BRT system to local practitioners. These practitioners will provide feedback that will help guide final product development. Each team develops a 3- to 5-page memo, PPT slides, and other physical graphics (posters, photographs, and illustrations) to present options in their own focus area. The memos will be integrated into a complete Draft Report by the Management Team.

The complete Draft Report will have the qualities of a good report listed in Task 1 plus:

- A description of the analysis methodologies used by each group (data collection approach, data source description, analysis techniques, limitations of the analysis).
- A clear summary of the results from your analysis, including graphic illustrations, charts, and tables. Professionals should be able to envision all elements of the BRT system from the information provided.

**Task 3: Prepare a final vision (or set of options) for BRT in the Milwaukee region to present at Public Workshop (Due Week 15; Public Workshop to be held during Week 14).** We will present our recommended alternatives for the BRT system to local practitioners, the public, and the media. Each team should develop 3 to 5 pages of text for the final report and prepare PPT slides and other physical graphics (posters, photographs, and illustrations) related to their own focus area to help the audience visualize the BRT vision. These materials will be integrated into a complete Final Report by the Management Team.

The complete Final Report will have the qualities of a good report listed in Task 1 and Task 2. It will be revised to address comments from the Practitioner Workshop and will be polished to a higher professional quality. This report should be ready to be posted on a website and to be shared with professionals and local media. The final presentation slides should have a logical organization that is able to illustrate the BRT vision. They should have few words. Instead, your words should communicate the information and be complemented by illustrations, charts, tables, and pictures.

### **Conduct and Ethics**

Cite your sources. If you get information from a printed, online, video or other source, cite it. If you cite a reference word for word, put those words in quotes. Don't use someone else's work as if it was your own without citing it. Citing sources, even if it takes extra time, enhances your professional credibility.

"Plagiarism includes: 1) Directly quoting the words of others without using quotation marks or indented format to identify them; or, 2) Using sources of information (published or unpublished) without identifying them; or, 3) Paraphrasing materials or ideas of others without identifying the sources."  
—University of Wisconsin-Milwaukee Graduate School, "Academic Misconduct," Website, Available online: <http://www4.uwm.edu/dos/conduct/academic-misconduct.cfm>, August 2015.

Additional University policies are available from: <http://www4.uwm.edu/secu/SyllabusLinks.pdf>.

## **Grading**

Grades will be given on an A to F scale based on the following components of the class:

- Task 1 (20%)
- Task 2 and Practitioner Workshop (30%)
- Task 3 and Public Workshop (30%)
- Individual participation and contribution to group assignments (10%). For each task assignment, each team member will evaluate the contributions of the other team members anonymously, and these evaluations will decide the individual grade.
- Individual participation and contribution to class (10%). This includes attendance, contribution to group and class discussions, and possible quizzes on weekly discussion topics and readings.

Assignments are due by 5:00 p.m. on the dates listed above. This class produces professional products. Late work is not an option.

The grading scale will be based on points earned out of 100 possible points in each component area. This scale is:

98 and above = A+  
93 to 97.9 = A  
91 to 92.9 = A-  
88 to 90.9 = B+  
83 to 87.9 = B  
81 to 82.9 = B-  
78 to 80.9 = C+  
73 to 77.9 = C  
(and so on)

In general, it is expected that students will spend approximately three hours in class per week plus an additional six hours per week on readings, assignments, and other preparation.

## **Class Topics, Reading List, Task Deliverables, and Discussion Format**

### **Class 0: Background—Getting Familiar with Bus Rapid Transit**

#### Readings (Videos):

- 0.1. Doherty, E. "Ottawa's Unique Bus Rapid Transit System," EcopathPlan, YouTube, Available online, <https://www.youtube.com/watch?v=AmE1YLdTv38>, 2013.
- 0.2. CDM Smith. "Stories that Matter: Transforming Cleveland through Bus Rapid Transit," YouTube, Available online, <https://www.youtube.com/watch?v=0Caa7KjkmtI>, 2015.
- 0.3. "Best BRT Systems in World Cities," OzeBusAndCoach, Making Things Happen with BRT, The Energy Foundation and The William and Flora Hewlett Foundation, YouTube, Available online, <https://www.youtube.com/watch?v=TvZXRxnZIQk>, 2012.

### **Class 1: Course Overview and Introduction to Bus Rapid Transit (9/14)**

#### Readings:

- 1.1. Institute for Transportation and Development Policy. *The Bus Rapid Transit Standard: 2014 Edition*, Available online, <https://www.itdp.org/wp-content/uploads/2014/07/BRT-Standard-2014.pdf>, 2014. (read pp. 6-23, skim pp. 24-56)
- 1.2. Cervero, R. *Bus Rapid Transit (BRT): An Efficient and Competitive Mode of Public Transport*, University of California, Berkeley Institute of Urban and Regional Development, Working paper 2013-01, Report prepared for European Automobile Manufacturers Association, Available online, <http://iurd.berkeley.edu/wp/2013-01.pdf>, August 2013. (Skim pp. 1-35)

### **Class 2: Transit Planning and BRT in Milwaukee (9/21)**

*Guest Speakers: Joe Peterangelo, Public Policy Forum on US BRT Examples & Kevin Muhs, Southeastern Wisconsin Regional Planning Commission (SEWRPC) on how BRT relates to regional recommendations & Vision 2050*

#### Readings:

- 2.1. Peterangelo, J. and R. Henken. *An Analysis of Best Practices for Improving Bus Speeds and their Potential Applicability to Milwaukee*, Prepared by Public Policy Forum, Available online, <http://publicpolicyforum.org/sites/default/files/PickingUpThePace-FullReport.pdf>, 2015. (read pp. 3-10)
- 2.2. Southeastern Wisconsin Regional Planning Commission (SEWRPC). "Special Issue—Bus Rapid Transit," *Regional Planning News*, Volume 2, Issue 4, Available online, <http://www.sewrpc.org/SEWRPCFiles/Publications/ENews/ENews->

[V2\\_4.pdf?utm\\_source=SEWRPC+Regional+Planning+News+Volume+2%2C+Issue+4+-+August+2015&utm\\_campaign=SEWRPC+Newsletter&utm\\_medium=email](#), August 2015.

2.3. Southeastern Wisconsin Regional Planning Commission (SEWRPC). *Preliminary Draft Alternative Plan I Rapid Transit Lines and Stations*, Vision 2050 Documents, Attachment 4, Available online, <http://www.sewrpc.org/SEWRPCFiles/CommissionFiles/CommitteeFiles/2015/2015-04-07-minutes-ejtf-att-4.pdf>, April 2015.

2.4. Southeastern Wisconsin Regional Planning Commission (SEWRPC). *Milwaukee County Transit System Development Plan*, Community Assistance Planning Report Number 279, Available online, <http://www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-279-milwaukee-county-transit-system-development-plan.pdf>, October 2010. (read pp. 5-9, 238-239)

2.5. Stout, M.L. *The Rehab/Transit Option: A Better Solution for Milwaukee's East-West Corridor*, Prepared for Wisconsin Public Interest Research Group, Available online, <http://www.wispirgfoundation.org/sites/pirg/files/reports/The%20Rehab-Transit%20Option%20-%20A%20Better%20Solution%20for%20the%20I-94%20East-West%20Corridor.pdf>, November 2014. (Optional)

2.6. Southeastern Wisconsin Regional Planning Commission (SEWRPC). *Fondy-National Bus Rapid Transit (BRT) Project*, Brochure, Available online, [http://www.sewrpc.org/SEWRPCFiles/Publications/ppr/2009-01\\_fondy-national\\_brt\\_summary\\_brochure.pdf](http://www.sewrpc.org/SEWRPCFiles/Publications/ppr/2009-01_fondy-national_brt_summary_brochure.pdf), January 2009. (Optional)

2.7. Dranzik, B. *Milwaukee County Bus Rapid Transit Project*, Presentation, Milwaukee County Transit System and Southeastern Wisconsin Regional Planning Commission, Available online, [http://www.sewrpc.org/SEWRPCFiles/Transportation/Files/transit-milwaukee/2009-01\\_pim\\_presentation\\_mke\\_c.pdf](http://www.sewrpc.org/SEWRPCFiles/Transportation/Files/transit-milwaukee/2009-01_pim_presentation_mke_c.pdf), January 2009. (Optional)

2.8. Wisconsin Department of Transportation. *East-West Corridor Alternatives Analysis/Draft Environmental Impact Statement, Milwaukee, Wisconsin, Final Definition of Alternatives, Deliverable 28*, Prepared for the US Department of Transportation, Federal Transit Administration, April 1994. (Optional)

2.9. Southeastern Wisconsin Regional Planning Commission (SEWRPC). *Milwaukee Northwest Corridor Rapid Transit Study: Report No. 10, Descriptions of Alternatives*, Prepared by Parsons Brinckerhoff Quade & Douglas, Inc., December 1985. (Optional)

2.10. Milwaukee County Expressway and Transportation Commission. *Milwaukee Area Transit Plan: A Mass Transit Technical Planning Study*, Prepared by Barton-Aschman Associates, Inc., June 1971. (Optional)

### **Class 3: BRT System Planning and Design (9/28)**

*Guest Speaker: Dan Meyers, AECOM, BRT Planning Expert (dan.meyers@aecom.com)*

Readings:

3.1. Schneider, R.J. "Theory of Routine Mode Choice Decisions: An Operational Framework to Increase Sustainable Transportation," *Transport Policy*, Volume 25, pp. 128-137, 2013. (Read pp. 129-134) *(This paper is focused on walking and bicycling, but think about its implications for transit.)*

3.2. Boyle, D.K. *Commonsense Approaches for Improving Transit Bus Speeds*, Transit Cooperative Research Program Synthesis 110, Transportation Research Board, Available online, [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_syn\\_110.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_syn_110.pdf), 2013. (Read pp. 1-14)

3.3. Hoffman, A. *Advanced Network Planning for Bus Rapid Transit: The "Quickway" Model as a Modal Alternative to "Light Rail Lite"*, US Department of Transportation, Federal Transit Administration, FL-26-7104, Available online, <http://www.nbrti.org/docs/pdf/BRT%20Network%20Planning%20Study%20-%20Final%20Report.pdf>, February 2008. (Read pp. 5-12; 29-45; 73-79)

Deliverable: List of documents each team plans to use for background report.

Discussion format: The instructors meet with individual groups separately.

### **Class 4: BRT Economic and Equity Development (10/5)**

*Guest Speakers: Alderman Nik Kovac, Alderman Bob Bowman, Alderman Mike Murphy [To be determined]*

Readings:

4.1. Levinson, D. "Does BRT have Economic Development Effects?" Streets.mn. Available online, <http://streets.mn/2013/09/11/does-brt-have-economic-development-effects/>, 2013

4.2. Carrigan, A., R. King, J.M. Velasquez, M. Raifman, and N. Duduta. *Social, Environmental, and Economic Impacts of BRT Systems: Bus Rapid Transit Case Studies from Around the World*, EMBARQ: A Program of the World Resources Institute, Available online, <http://www.wrcities.org/sites/default/files/Social-Environmental-Economic-Impacts-BRT-Bus-Rapid-Transit-EMBARQ.pdf>, 2014.

Deliverable: Thorough outline of the background report.

Discussion format: The instructors meet with individual groups separately.



## **Class 5: Transit System Engineering: Roadway Design and Demand Estimation (10/12)**

*Guest Speakers: Jeff Polenske, City Engineer, City of Milwaukee; Sheri Schmit, Deputy Director, Southeast Region, Wisconsin DOT; Jie Yu, UWM Civil Engineering [To be determined]*

Readings:

5.1. Federal Transit Administration. *Characteristics of Bus Rapid Transit for Decision-Making*, U.S. Department of Transportation, Authors: Diaz, R.B. and D. Hinebaugh, Available online, [http://www.fta.dot.gov/documents/CBRT\\_2009.pdf](http://www.fta.dot.gov/documents/CBRT_2009.pdf), 2009. (Optional. Good reference for detailed guidance on specific system elements.)

5.2. Kittleson & Associates, Inc. *TCRP Report 118: Bus Rapid Transit Practitioner's Guide*, Transit Cooperative Research Program, Transportation Research Board, [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_118.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_118.pdf), 2007. (Read pp. 1-20) (Optional. Chapter 3 is on estimating BRT ridership.)

Deliverable: Draft background report (including physical documents for discussion in class).

Discussion format: The instructors meet with individual groups separately.

## **Class 6: BRT Background Analysis (10/19)**

*Guest Speaker: Brian Dranzik, Milwaukee County Transit System (MCTS) to provide feedback on background report and share latest developments on MCTS BRT planning.*

Deliverable: Complete background report.

Discussion format: All teams present their specific findings from the background report. In-class presentations will be timed. The instructors and whole class will ask questions after each presentation.

## **Class 7: Transit System Costs and Finance (10/26)**

*Guest Speaker: Rob Henken on Politics and BRT/transit finance*

Readings:

7.1. Henken, R.E., R.J. Horton, and J.K. Schmidt. "Milwaukee County's Transit Crisis: How did we get Here and What do we do Now?" Public Policy Forum, Available online, <http://publicpolicyforum.org/sites/default/files/MilwaukeeTransitCrisis.pdf>, May 2008.

Deliverable: Data and Methodology for scenario analysis

Discussion format: All groups present data needs and methodology to the whole class. The instructors and the class will discuss.

### **Class 8: Transit Station Design (11/2)**

*Guest Speakers: James Piwoni, American Design; Carolyn Esswein, UWM/CDS [To be determined]*

Deliverable: Draft analysis results

Discussion format: The instructors meet with individual groups separately.

### **Class 9: Transit Advocacy, Equity, and Economic Development (11/9)**

*Guest Speakers: Kerry Thomas, MetroGO; Jim Plaisted, North Avenue BID; Beth Weirick, Downtown Milwaukee BID; Kirk Harris, UWM [To be determined]*

Readings:

9.1. Taylor, B.D. and E.A. Morris. "Public Transportation Objectives and Rider Demographics: Are Transit's Priorities Poor Public Policy?" *Transportation*, Volume 42, pp. 347-367, 2015.

Deliverable: Updated draft analysis results; Updated background report (based on instructor comments on deliverable from Week 6)

Discussion format: All groups present their draft analysis to the whole class. In-class presentations will be timed. The instructors and whole class will ask questions after each presentation.

### **Class 10: Practitioner Workshop Preparation (11/16)**

*Guest Speakers: Possibly staff from MCTS or Milwaukee County (Brian Dranzik) [To be determined—could attend any class from 7 to 10 to provide feedback]*

Deliverable: Draft team sections for Task 2 report (including physical documents for discussion in class) and draft PPT for Practitioner Workshop presentation (to be shared in class).

Discussion format: The instructors meet with individual groups separately. \*Some class time to work on analysis and presentations.

### **Class 11: Practitioner Workshop (11/23)**

*(Invitees: Brian Dranzik, Milwaukee County Transit System (MCTS); Tom Winter, MCTS; Ken Yunker, SEWRPC; Kevin Muhs, SEWRPC; Ghassan Korban, City of Milwaukee; Jeff Polenske, City of Milwaukee; Sheri Schmit, Wisconsin DOT; James Piwoni, American Design; Dan Meyers, AECOM; Carolyn Esswein, UWM; Kirk Harris, UWM; Jie Yu, UWM; Kerry Thomas, MetroGO) [To be determined]*

Deliverable: Task 2 report and PPT due

Discussion format: All groups present their alternatives and analysis to practitioners.

### **Class 12: Practitioner Workshop Recap (11/30)**

Deliverables: Final Task 2 Report; Summary of workshop feedback and Revision strategies (presented in class; the teams do not need to turn in physical documents)

Discussion format: All groups present their summary and ideas for revision to the whole class. In-class presentations will be timed. The instructors and whole class will ask questions after each presentation.

### **Class 13: Public Workshop Preparation (Draft Presentation) (12/7)**

Deliverable: Draft presentation (presented in class) and draft final report (physical documents).

Discussion format: All groups present their draft final report sections, presentation slides, and presentation boards to the whole class and get feedback from students and instructors. In-class presentations will be timed. The instructors and whole class will ask questions after each presentation.

### **Class 14: Public Workshop (Final Presentation) (12/14)**

*(Invitees: All practitioners from Practitioner Workshop; Milwaukee Journal-Sentinel; Milwaukee Business Journal; Urban Milwaukee; Milwaukee County Executive Abele; City of Milwaukee Mayor Barrett; City of Wauwatosa Mayor Kathleen Ehley; Waukesha County Executive Paul Farrow; City of Waukesha Mayor Shawn Reilly; City of Brookfield Mayor Steven Ponto; Dean Greenstreet; Chancellor Mone) [To be determined]*

Deliverables: Final presentation slides and presentation boards.

Discussion format: All groups present to public attendees and get feedback. Revisions to the final report should be made during the week based on this feedback.

### **Final Report Due Friday, 12/18**